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# DEVELOPMENT OF AN AIRCRAFT INCIDENCE METER

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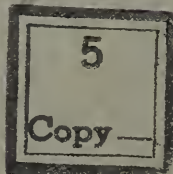
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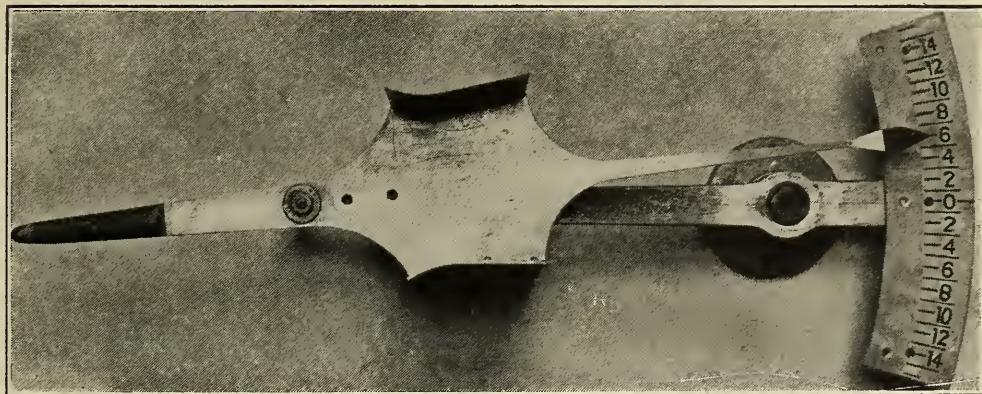
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*Preface.*—To enable the air pilot to read at a glance the direction of flow of the air past his airship or airplane, a balanced weathervane indicating promptly small changes of incidence has been developed and tried under regular working conditions. The scale drawings and test of the device herein described were made respectively by Mr. L. H. Crook and Mr. S. S. Rathbun, members of the aeronautics staff at the Washington Navy Yard.

FIG. 1.



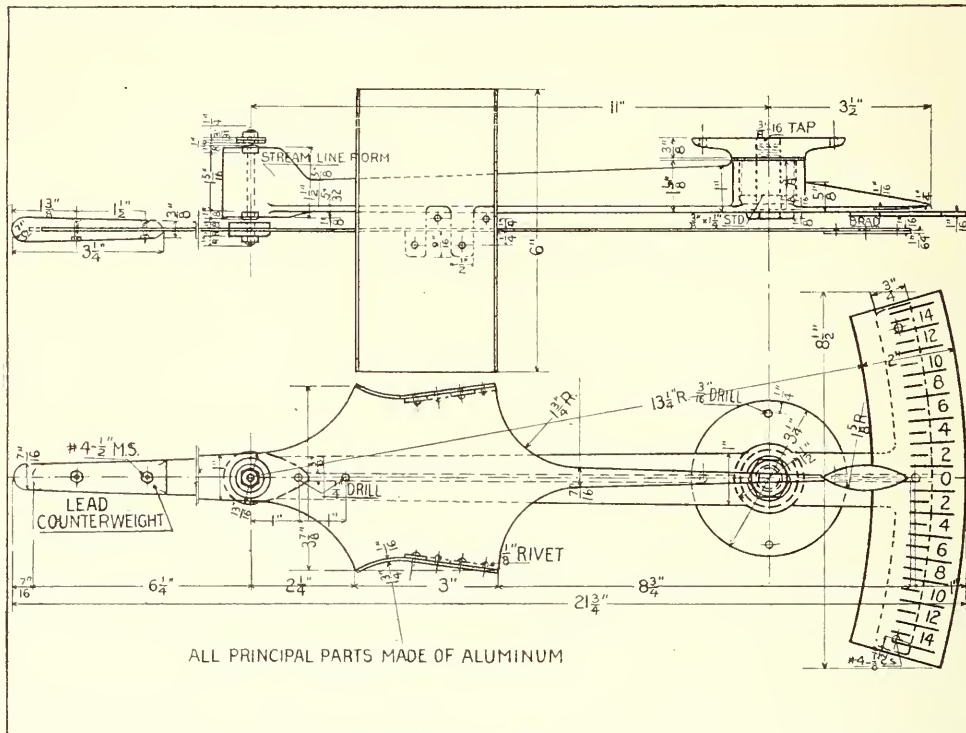
Aircraft incidence meter.

*Model.*—Figs. 1 and 2 give the general appearance and dimensions of this instrument. It consists of a two-blade weathervane supported on a horizontal pivot at the end of a bracket arm protruding forward from an airplane strut and adjustable in pitch by means of the clamping nut at its base. The vane has a forward counter-weight to insure static balance, and a pointer playing on a graduated arc of fourteen inches radius, indicating even degrees

\* Communicated by the Author.

and readable to fractions of a degree from the pilot's seat. The blades have the sectional shape of an Eiffel Wing No. 5, which at zero incidence possesses very slight drag and a large increase of lift with slight increase of incidence.

FIG. 2.



Plan for aircraft incidence meter.

*Wind Tunnel Test.*—When the instrument was given its preliminary test in the 8' × 8' tunnel its pointer remained steadily fixed in the wind direction until forcibly displaced. It then promptly returned to zero incidence without lag or indication of friction.

*Observations with C. & R. Incidence Meter in Flight.*

Speed of Flight in Knots	55	65	75
Normal variation . . . . .	± 0.6°	± 0.4°	± 0.4°
Precision of reading possible . . . . .	± 0.3°	± 0.2°	± 0.2°
Occasional variation . . . . .	± 2.°	± 1.°	± 1.°

*Test in Flight.*—The instrument was finally mounted midway between planes on the nearest right-hand strut of Flying Boat HS-2 No. 1840, and carried through very still air at three different fixed speeds. The preceding table indicates its behavior under these circumstances.

*Conclusion.*—If this instrument is to be put into use, it may be lightened somewhat and provided with a strap to lash its flange to the aeroplane strut. So finished, it would weigh about 1.5 pounds.











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